Annales UMCS Informatica AI 4 (2006) 304-313

Annales UMCS
Informatica
Lublin-Polonia
Sectio AI

http://www.annales.umcs.lublin.pl/

Multimedia in management facing globalization processes and cognitivistics

Jerzy Wąchol*

Faculty of Management, AGH-University of Mining and Metallurgy,
Gramatyka 10, 30-067 Kraków, Poland

Abstract

The paper covers the use of multimedia and the Internet in management, focusing mainly on globalization and management process (planning, organization, motivation and control). The use of modern multimedia and the Internet in management must be thoroughly thought over because it has both chances and new possibilities as well as hazards for companies, employees and clients in the new age of knowledge, information technologies and globalization. The paper also presents the statistical data in selected countries about the saturation of multimedia in the World.

1. Introduction

Owings to the significant technological process of last decades the use of multimedia in modern world is really enormous and it is still increasing. Computers, computer networks, mobile phones, calculation centers and data bases, automatic information and management centers, mass media, radio or television are already a permanent element of management practice.

Multimedia are practically at every management step, planning, organization, motivation and control – especially at operational processes. Moreover, they are widely applied to financial operations, banks, information (also confidential) transfer in marketing, public relations, etc.

Owing to mass popularization of multimedia the world becomes a global village. All information, ideas or tasks can be very quickly transferred and spread to every part of our planet. Moreover, it gives the possibility of service and technology transfer on a large scale in globalizing economy. All this, as any great invention, has its possibilities and chances but, on the other hand, can cause enormous dangers. Technologies which are imperfect and also misused can be the reason for many problems and tragedies. The legal system which, as

* *E-mail address*: hol@uci.agh.edu.pl

usual, does not follow technological changes and global economy, is also important here.

Due to its limitations, the paper includes only selected aspects of management, globalization and net economy processes, presents the popularization of multimedia in the world quoting statistic data related to Gross Domestic Product and demographic data. This paper also presents the elements of cognitivisitcs and influence of multimedia on man and their activity.

2. Globalization process and multimedia

In modern world there are many views both for globalization and against it, from extreme liberalism to extreme etatyzm. It seems, however, that from the civilization point of view the globalization process cannot be avoided. There is still a question about the shape of globalization, its implementation, its beneficiaries, etc. There is probably a need of a compromise between extreme ideologies and interests of individual groups.

Tendencies of constant fight of different interests and rapid appearance of new economic phenomena, on one hand, are limited by the tendencies of closing these processes within clear legal state regulations connected with the informative revolution. These processes acquired a new character especially on the turn of XX and XXI centuries. From these points of view, computer networks can become the basic element of the future global management system which will cover the whole human life.

Globalization processes have taken place on different scale and pace for hundreds of years. But they acquired a decisive dynamics at the time of great geographical discoveries. They accelerated much with consecutive, revolutionary scientific-technical discoveries, from steamships and railways up to modern jet planes, large tankers, through telegraph and telephone up to modern Internet [1].

The last 20th century, known as the age of steam and electricity played a very special role, the present 21st century is supposed to be the age of information and knowledge. In the present world many opinions both and against globalization can be encountered, from extreme neo-liberalism to extreme state control. It seems, however, that from the civilization point of view, globalization processes are not to be avoided. Here comes the question: what kind of globalization will it be, how will it be implemented, who will it suit, whose interests will be represented, etc. Probably, a certain compromise between these ideologically extreme views and interests of individual groups is necessary. Tendencies for constant confrontation of different interests and spontaneous formation of new economic phenomena on one hand, are limited by the tendencies to keep these processes within clear, legal regulations connected with the information revolution. These processes developed a particular character especially at the end of the 20th century and at the beginning of the 21st century.

From this point of view, computer networks can become a basic element of future global management system, covering the whole human life.

Conditions of the present globalization process create, of course, many old and new problems concerning, among others, social, economical, technical, technological, legal, organization, cultural, awareness and ecological areas. Polarization and differentiation of the world, e.g. into richer and poorer is growing, migrations, capital and culture flows are becoming more intensive. The control of the state over multinationals is usually limited. Supranational computerization and communication standards structure is being built. It creates both opportunities and threats form the point of view of states, nations, business groups and ordinary people. The question arises: how will the globalization process be conducted and who will benefit from it?

The use of e-business, of course, brings many new possibilities or changes in economy and management, but requires modern, technological infrastructure – this requirement is connected with large, financial investments. As it can be seen from the data presented, e-business develops fastest in rich areas, such as the USA and EU, where 2/3 of the world's GDP is produced, causing an additional large economic growth using multimedia (like the loop of positive feedback) in spite of the fact that in rich, developed countries the growth dynamics of GDP is very small (0.1-3%) per year. However, non-material values, like in a typical information society, begin to dominate. Although American and EU goals are similar (information society) the way of their achievement is different. The Americans believe more in market self-regulation and business profits, the EU also stresses state regulations and social values – hence the program e-Europe. Probably, a certain compromise to achieve mutual goals (within the frames of globalization) and fulfill the rowing needs of the population can be made.

Table 1 shows the saturation of multimedia in different world countries in relation to the number of population and GDP per head. It can be stated that the greater the saturation of multimedia, the higher living standard is.

Table 1. Saturation of multimedia in relation to GDP and the number of population in selected World countries

	State /year	Internet users mln	Popula-tion mln	GDP real per capita thousands USD	GDP real growth rate %	Internet hosts mln	Telepho-nes main lines in use mln	Telephones mobile cellular mln
		↓ /year	2004	2003	2003	/year	/year	/year
1	USA	159.3 /03	293.0	37.8	3.1	115.3/02	181.6/03	158.7/03
2	China	79.5 /03	1298.8	5.0	9.1	0.16 /03	263.0/04	269.0/03
3	Japan	57.2 /03	127.3	28.2	2.7	12.9 /03	78.1 /02	86.6/ 03
4	Germany	39.0 /03	82.4	27.6	-0.1	2.7 /04	54.3 /03	64.8 /03
5	Korea S.	29.2 /03	48.5	17.0	3.1	0.7 /01	22.9 /03	33.6 /03

Table 1, continuation

	State /year	Internet users mln	Popula-tion mln	GDP real per capita thousands USD	GDP real growth rate %	Internet hosts mln	Telepho-nes main lines in use mln	Telephones mobile cellular mln
		↓ /year	2004	2003	2003	/year	/year	/year
6	G. Britain	25.0 /02	60.3	27.7	2.2	3.4 /04	34.9 /02	49.6 /02
7	France	21.9 /03	60.4	27.6	0.5	2.3 /04	33.9 /03	41.6 /03
8	Italy	18.5 /03	58.0	26.6	0.4	1.4 /04	26.6 /03	55.9 /03
9	India	18.5 /03	1065.1	2.9	8.3	0.09 /03	48.9 /03	26.1 /03
10	Canada	16.1 /03	32.5	29.8	1.7	3.2 /03	19.9 /03	13.2 /03
11	Brazil	14.3 /02	184.1	7.6	-0.2	3.1 /03	38.8 /02	46.3 /03
12	Mexico	10.0 /02	104.9	9.0	1.3	1.3 /03	15.9 /03	28.1 /03
13	Spain	9.7 /02	40.3	22.0	2.4	1.1 /04	17.6 /03	37.5 /03
14	Australia	9.5 /02	19.9	29.0	3.0	2.8 /03	10.9 /03	14.3 /03
15	Poland	9.0 /03	38.6	11.1	3.7	0.8 /04	12.3 /03	17.4 /03
16	Netherlands	8.5 /03	16.3	28.6	-0.7	4.5 /04	10.0 /02	12.5 /03
17	Russia	6.0 /02	143.7	8.9	7.3	0.5 /04	35.5 /02	17.6 /02
18	Turkey	5.5 /03	68.9	6.7	5.8	0.4 /04	18.9 /03	27.8 /03
19	Sweden	5.1 /02	8.9	26.8	1.8	0.9/ 04	6.6 /02	7.9 /02
20	Iran	4.3 /03	69.1	7.0	6.1	0.005/04	14.5 /03	3.4 /03
21	Argentina	4.1 /02	39.1	11.2	8.7	0.7 /03	8.0 /03	1.5 /02
22	Romania	4.0 /03	22.3	7.0	4.9	0.05 /04	4.3 /03	6.9 /03
23	Austria	3.7 /03	8.1	30.0	0.7	0.4 /04	3.9 /03	7.0 /03
24	Portugal	3.6 /02	10.5	18.0	-1.3	0.3 /04	4.3 /03	9.3 /03
25	Belgium	3.4 /03	10.3	29.1	1.1	0.2 /04	5.1 /02	8.1 /02
26	Hong-Kong	3.2 /03	6.9	28.8	3.3	0.6 /03	3.8 /03	7.2 /03
27	Africa S.	3.1 /02	42.7	10.7	1.9	0.3 /03	4.8 /02	16.9 /03
28	Denmark	2.7 /03	5.5	31.1	0.0	1.2 /04	3.6 /03	4.7 /03
29	Czech Rep.	2.7 /03	10.2	15.7	2.9	0.3 /04	3.6 /03	9.7 /03
30	Finland	2.7 /02	5.2	27.4	1.9	1.2 /04	2.5 /03	4.7 /03
31	Switzerland	2.5 /03	7.5	32.7	-0.5	0.7 /04	5.5 /02	6.1 /03
32	Norway	2.3 /02	4.6	37.8	0.6	0.6 /04	3.4 /02	4.2 /03
33	Israel	2.0 /02	6.2	19.8	1.3	0.5 /04	3.0 /02	6.3 /02
34	Greece	1.7 /03	10.6	20.0	4.7	0.2 /04	5.2 /03	8.9 /03
35	Hungary	1.6 /02	10.0	13.9	2.9	0.4 /04	3.6 /02	6.9 /02
36	Slovakia	1.4 /03	5.4	13.3	3.9	0.09 /04	1.3 /03	3.6 /03
37	Belarus	1.3 /03	10.3	6.1	6.8	0.005/04	3.0 /03	1.1 /03
38	Ireland	1.2 /03	3.9	29.6	1.4	0.2 /03	1.9 /03	3.4 /03
39	Latvia	0.9 /03	2.3	10.2	7.4	0.05 /04	0.6 /03	1.2 /03
40	Ukrainian	0.9 /03	47.7	5.4	9.4	0.1 /03	10.8 /02	4.2 /02
41	Lithuania	0.7 /03	3.6	11.4	9.0	0.06 /04	0.8 /03	2.1 /03
42	Slovenia	0.7 /02	2.0	19.0	2.3	0.04 /04	0.8 /03	1.7 /03
43	Uruguay	0.4 /0.2	3.4	12.8	2.5	0.09 /03	0.9 /02	0.7 /02

Table 1, continuation

	State /year	Internet users mln	Popula-tion mln	GDP real per capita thousands USD	GDP real growth rate %	Internet hosts mln	Telepho-nes main lines in use mln	Telephones mobile cellular mln
		↓ /year	2004	2003	2003	/year	/year	/year
44	Zimbabwe	0.5 /02	12.6	1.9	-13.6	0.004/03	0.3 /03	0.4 /03
45	Kenya	0.4 /02	32.0	1.0	1.5	0.008/03	0.3 /03	1.5 /03
46	Luxemb.	0.2 /03	0.5	55.1	1.2	0.03 /03	0.4 /02	0.5 /02
47	Cuba	0.1 /02	11.3	2.9	2.6	0.002/03	0.6 /02	0.02 /02
48	Zambia	0.07 /03	10.5	0.8	4.0	0.002/03	0.09 /03	0.2 /03
49	World	604.2 /03	6379.2	-	3.8	-	843.9	-

Source: Own elaboration on the basis of [2]

3. The use of multimedia in management

The use of multimedia, microprocessors, computers and computer networks is common today – however, I think that it has a unique and large significance in management because it makes management more effective and optimum, where decisions can be made with the use of modern forecasting methods, data processing, simulation calculations, etc. It does not relieve the manager from decision-making processes, but it can help him to make the right decisions. The planning function can be supported with data processing, multiple calculations and simulations. The organization and motivation function can be reinforced with data based, modern communication, calculation, multimedia training means. The control function can be largely used through reports, monitoring, saving nearly everything including the place of an employee on the Earth in a given moment with the use of GSM/DCS and UMTS telephones and GPS satellite positioning equipment. Management Process [3] presenting the regulation equipment system is shown in Fig. 1 and the operational system of the enterprise in Fig. 2.

The use of multimedia, computers and the Internet considering management functions is shown in Table 2.

Table 2. The use of multimedia, computers and internet in management (source: own research)

MANAGEMENT FUNCTIONS		
Planning	Organization and motivation	Control
– forecasting – simulation calculation – data processing, modeling, etc.	– data bases – communications and identification means – saving – staff training and teaching, etc.	– monitoring – reports, calculations, comparisons – positioning, etc.

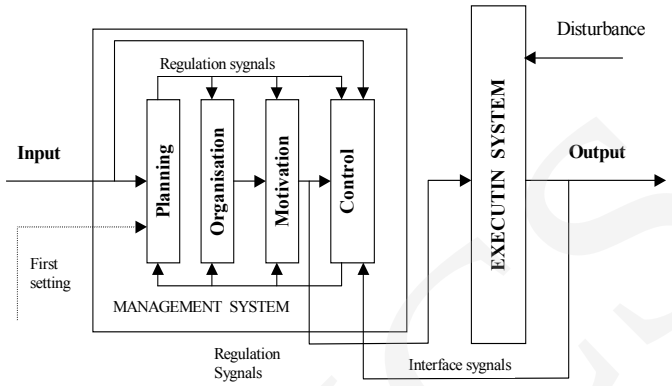

Fig. 1. Management Process of the regulation equipment system [4]

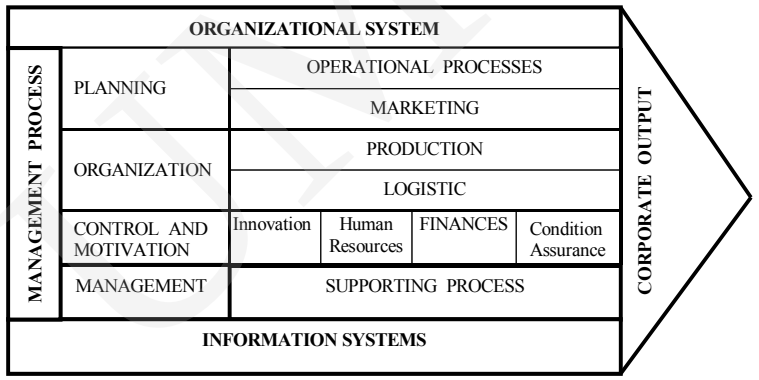

Fig. 2. The operational system of the enterprise. Source: own elaboration on the basis of [5,6]

Although it seems obvious that the use of multimedia, computers, the Internet, GSM/DCS/UMTS phone systems, etc. may only help in management and economy it may also happen that the wrong use of these techniques can lead to failure or even a tragedy. The manager who believes in the only right computer prints and makes his decisions on their basis can fail since computer technology, though more and more sophisticated, is still very limited, based on the already existing programs which often do not take into consideration all the assumptions. In practice the manager's „thinking" cannot be substituted by computers in the management process, it can, however, help him significantly.

The relation between power, money and information knowledge is shown in Fig. 3.

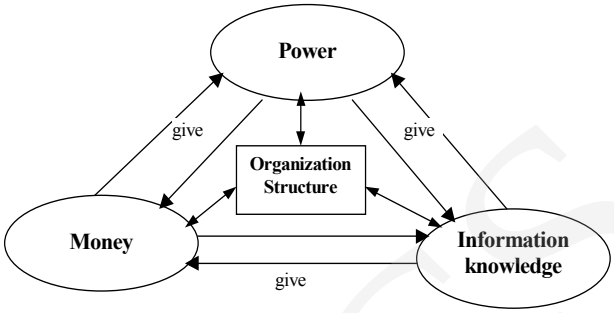

Fig. 3. The relation between power, money and information knowledge(source: own research)

The next problem is connected with the implementation of modern computer and communication systems in companies. I think that many mistakes may be made here. On the other hand, a too comprehensive manager's control including the positioning of an employee at a given moment – can lead to dissatisfaction of the employees who are not used to such methods, their stress and, consequently, worse work results. In the case when the employees are against it, are not mentally prepared because of e.g. psychological reasons and safety, I think that it is not worth using it, the employee can be evaluated by the work they have done without an expensive observing their movements and position. The use of new technologies and new management methods by force at an area and with people who are totally unprepared for this – can bring about most fatal, expensive and thoughtless results. The theory of management says that an employee needs some minimum of freedom in order to perform their duties well.

Another danger of thoughtless introduction of modern or pseudo-modern computer technologies can be massive losses of states, firms and clients themselves due to viruses and badly protected computer telecommunication, cheque transfers and secret information networks, etc. Here, great care and mastering of protection systems using microprocessor with an algorithm credit and phone cards – and not ordinary, magnetic ones, must be used.

4. Cognitivistics, medial experience and human behavior

New information and informative technologies era makes the surrounding world a world of collective imagination. This concerns mostly the use of mass media such as radio, television or computer networks which, to some extent, can create a virtual reality in human minds and psychology.

Even if some facts have never existed or their influence was relatively small, owing to mass media they can exist medially. Then they start existing in human psychology, thus creating specific experiences and changes in human behavior, also creating new, but not necessary useful knowledge. People should approach the transferred and created information with care, criticism and intelligence and

not consider such information as being true – if one does not experience it consciously and physically. Then, his world may become virtual and separated form reality. There must be a filter in human minds which separates information more or less important, true or false, etc.

The development of multimedia technologies aims probably at taking over the functions of television, radio, VCR, press, books, telephone, mail, fax, library, data bases or game machines by computers, computer programs and computer networks. In future it may only be one computer machine with attached interfaces. When people's mentality changes and adequate portable screens are applied even books will be better read from computer screens since there will be additional possibilities, e.g. fast finding of phrases, putting thousands of books on one mini-disc, possibility of marking fragments of texts for better remembering and making interactive versions of drawings and pictures. It may be difficult and expensive as well as require new technologies but, at the same time, there appear new possibilities for publishers and writers who must learn how to use these new methods of transfer and must know how to write a book or an article in the electronic version. Although new technologies are a challenge to mankind and give a wider scale of possibilities, they are still at the level of tools (programmed, shaped) which are used by a more complicated and intelligent creature – man.

There is no doubt that the computer having specific properties will be a kind of a hyper-medium and will make an intellectual aid in processing information by man. The analysis of this problem is not easy because it needs analyzing many areas which are deeply rooted in many sciences known under a mutual name of cognitivistics [7]. Due to the limits of this paper I will concentrate on a simplified presentation of connections between sciences dealing with cognition and humanistic aspect of technologies. Here we can separate many platforms which are the base for functioning of man who is trapped in informative technologies. Cultural and social aspects are very important here. External informative world (and not only) overlaps internal world of human psychology. As we know, man has several psychological layers which are responsible for feelings, cultural archetypes and awareness. Adequate multimedial preparation and presentation of information can have a sublime impact on specific layers in human psychology, e.g. feelings, thus broadening this layer while narrowing the awareness. These techniques are used in advertising and public relations in order to make the customer buy a product and creat a good image of a company. They are the activities which influence human psychology. Through experience and internal stimulus man is induced to certain behavior, including cultural behavior at a specific time and place. It is difficult to say whether it is good or bad but such is the situation and surely there are limits for such activities. Man himself can become resistant to these activities with time.

5. Conclusions

In spite of all significant and still increasing possibilities of multimedia we can assume that at the present stage of development multimedia and computers are only tools in human hands and, from this point of view, they can be used in different ways – according to their possibilities, destination and human decisions. In management practice they are mainly used at the operational level for formalized, structured, repeatable and programmable activities.

On the other hand, if problems cannot be easily described by an algorithm or the phenomenon is relatively new the use of machines in decision-making is practically impossible at this stage of development. Here, manager's decisions are still needed; he can only support himself with modern technology (information transfer, data collecting and processing, etc.). It refers mainly to the strategic level of management where decisions are usually taken in risky, unsure and even turbulent conditions.

Mass spread of multimedia thanks to technological achievements, especially during the last 150 years have created real possibilities of their application to many aspects of human life, including management on a large scale, creating event the base for global management and global world economy where everything can be produced and sold. Also, exchange and spreading of technology and information can be done on a large scale at the enormous speed. It gives a chance but also, as it is in the case of important events, carries dangers. Everything depends on the use of these technologies and their perfection.

As the data in Table 1 shows, the saturation of multimedia is usually larger in highly-developed with a high GDP level per person. In these countries the number of mobile phones can be compared to the number of population. We can draw a conclusion that these means can serve a better development and functioning of the states, business organizations or people themselves, but it is not always so.

Surely, the use of e-business, and internet economy gives many possibilities and chances in economy or management but it also requires modern technology infrastructure which needs large financial investments. As it can be seen from the presented data, internet economy and e-business with the use of multimedia is best developed in the richest areas, e.g. the USA or EU where 2/3 of the world's GDP is produced. However, non-material values, as in a typical information society, increase in value.

References

[1] Główczyk J., *Uniwersalny słownik ekonomiczny*. Fundacja Innowacja, Warszawa, (2000) 385, in Polish.
[2] Central Intelligence Agency (CIA) USA: www.cia.gov (The World Factbook), (2005).
[3] Steinman H, Schreyogg G., *Zarządzanie, podstawy kierowania przedsiębiorstwem*. Politechnika Wrocławska, Wrocław (1992) 8, in Polish.

[4] Peszko A., *Podstawy zarządzania organizacjami*. Wydawnictwo AGH, Kraków, (1997) 51, in Polish.
[5] Stoner J., Freeman E., Gilbert D., *Kierowanie*. PWE, Warszawa, (2001) 562, in Polish.
[6] Kaszprzak T., *Biznes i technologie informacyjne*. Wyd. Uniwersytety Warszawskiego, Warszawa, (2003) 81, in Polish.
[7] Siemieniecki B., *Komputery i hipermedia w procesie edukacji dorosłych*. Wyd. A. Marszałek, Toruń, (1998) 3, in Polish.